AD A134 247 VISIBILITY AND VERTICAL STRUCTURE MEASUREMENTS IN SOUTHERN GERMANY(U) FRAUNHOFER INST FUER ATMOSPHAERISCHE UMWELTFORSCHUNG GARMISCH... R REITER

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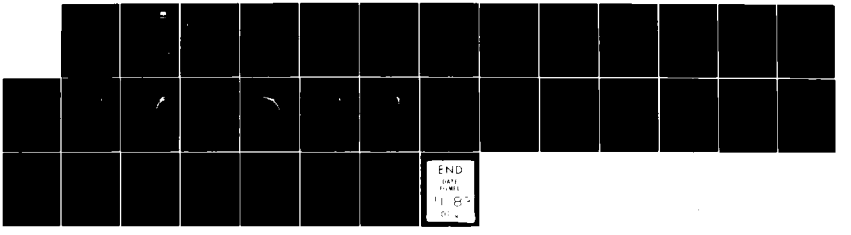

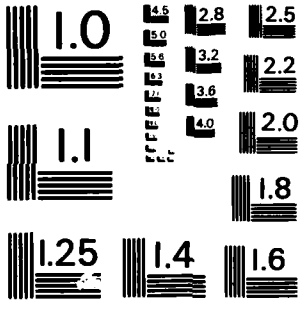

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

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Title of the Research Project:

VISIBILITY AND VERTICAL STRUCTURE MEASUREMENTS IN SOUTHERN GERMANY

Principal Investigator:

Dr. Reinhold Reiter, Director

Name of Contractor:

Fraunhofer-Institut für
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Kreuzeckbahnstrasse 19
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Contract Number:

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3rd INTERIM REPORT

for the period:

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1. Short Description of the Lidar System Used for this Research, Improvements and Modifications

The lidar used for this project is a mobile system with a ruby and a neodymium glass laser transmitter. Both lasers are operated with and without frequency doubling, resulting in available frequencies of 347, 530, 694, and 1060 nm. The backscattered light is collected by a 30 cm dia. reflecting telescope, and detected by an EMI 9813 photomultiplier tube with bialkali cathode (347 and 530 nm) and a large-area PIN-diode with broadband amplifier (694 and 1060 nm). The signals are digitized by a Biomation 8100 transient recorder with 8 bit amplitude resolution, 10 ns minimum sample interval and 2000 bytes memory, and further processed by an on-line computer. The range-corrected and energy-normalized backscatter profiles are represented on a display tube and plotted by an X-Y plotter, both incorporated in the lidar system. The digitized original returns are stored on floppy disks or magnetic tape cassette, together with housekeeping and other auxiliary data.

In the past, the change from the fundamental wavelength to the first harmonic was done for both lasers through manual replacement of the beam expanding telescopes which are focused and aligned respectively for only one wavelength. The frequency doublers were connected to one of the telescopes each. In order to avoid this time-consuming procedure, at least for the neodymium laser, an achromatic telescope with common focus for 530 and 1060 has been calculated and constructed, which can remain permanently in the beam path, so that the neodymium laser transmits both wavelengths simultaneously. The time lag between measurement in both wavelengths is thus only limited by the data processing time, which is a few seconds if a real-time display and plot of the normalized profiles is dispensed with.

Unfortunately, a similar procedure is not applicable to the ruby laser because no UV-permeable optical glasses with sufficiently different dispersion are available. For the present task the 347 nm wavelength is less important anyway. Nevertheless, an optical construction is in progress allowing the expanding of the 694 nm beam by the new achromatic telescope, too. For this purpose, a beam divider and a deflection mirror will be built into the system.

The originally fixed gain of the diode detector amplifier proved to be too high for the recording of the strong backscatter signals from clouds and fog without overload effects. For attenuation of those signals two neutral filters with transmissivities of 50 and 25%, respectively, were inserted into free positions of the interference wheel. Furthermore, by switching to a smaller feedback resistor, it is now possible to reduce the gain by a factor of 11.6.

2. Program Developments

The application of Klett's evaluation method for lidar returns requires a considerable amount of computation work. To do this, some time ago a program was developed for the lidar on-line computer. Profiles of the extinction coefficient calculated from the lidar data by Klett's method and the "standard" method, where the boundary value is chosen close to the lidar system and the integration of the lidar equation proceeds away from it (called "CRBV method" in the previous interim report), were plotted by the above-mentioned X-Y-plotter. This plotter, however, is not very comfortable and precise, especially if curves with heavy fluctuations are to be displayed. Furthermore, the memory capacity of the lidar on-line computer (32 k bytes) is somewhat too small for the handling of large amounts of data like digitized lidar returns. For these reasons

we decided to transfer all raw lidar data via magnetic tape to the larger computer which is available since about a year. This computer offers 512 k RAM and 400 megabytes disc memory. The operating system can support up to 63 simultaneous users. Each user is totally independent and has 768 kilobytes virtual memory at his disposal. An extensive library of auxiliary programs and subroutines is available, for instance, routines for the precise display of curves on a graphic terminal screen or by an incremental plotter.

The programs for the application of the Klett and standard method for the evaluation of lidar returns have been rewritten in FORTRAN language for this new computer. Furthermore, extensions have been made for performing the following tasks:

- listing of the digitized original lidar return as function of distance
- linear plot of the original, not range-corrected lidar return
- linear plot of the range-corrected lidar profile in absolute units
- logarithmic plot of the range-corrected lidar profile,
- linear plot of the extinction coefficients and optical depth profiles, calculated by the standard and Klett's method
- listing of the extinction coefficient and optical depth versus distance
- storage of digitized raw lidar data and calculated extinction coefficient and optical depth profiles on magnetic tape in any desired format.

The disc memory capacity of the computer is large enough for permanent storage of numerous lidar returns and calculated profiles of optical parameters, which greatly facilitates the computation work. Examples of listed and plotted profiles will be described in Chapter 4.

3. Measurements

In general, situations with strong and inhomogeneous fog or aerosol backscatter in the near-ground atmosphere occur less frequently during summertime. However, in some cases we were able to get lidar returns from a turbid atmosphere, with scattering coefficients distributed both homogeneously and inhomogeneously along the laser beam path (measurements before April 1983 have already been listed in the previous interim reports).

On June 29, a very humid air mass with high aerosol concentration was present, and in the morning some low-level cumulus fractus clouds occurred. Spatial inhomogeneities of the backscatter coefficient were observed also outside the cloud, caused by partial precondensation (growth of the aerosol particles due to water absorption). Towards noon, the humidity decreased, and the backscatter became homogeneous in the lowest 1000 m of the atmosphere. Five measurement series were obtained in the wavelengths 530, 694, and 1060 nm.

On July 14, similar aerosol conditions occurred after a thundershower. Again, cumulus fractus clouds were observed about 400 m above ground level during the morning hours, and strong and initially inhomogeneous aerosol backscatter below. Like on June 29, the backscatter homogenized with decreasing humidity towards noon time, but the concentration of the dry aerosol was considerably higher in this case. Eleven series of measurements were performed in each wavelength. One of them will be discussed in more detail in the next section of this report.

During the next day, July 15, the aerosol constitution remained nearly unchanged. In the afternoon some measurements were performed under homogeneous conditions.

On August 12, a shallow layer of low-concentrated ground fog was present during the late night and early morning hours. This layer, however, dissolved then very rapidly, and so only one lidar return was obtained at 6 AM CET.

4. Further Example of Extinction Coefficient Profiles Calculated by the Klett and CRBV Method, Application of Aerosol Data for Derivation of Klett Boundary Values

The basic principle of Klett's method is to choose the boundary value for the extinction coefficient at the far end of the range interval, not at the close one. The dependence of this boundary value (BV) upon the resulting extinction coefficient profile is the less the higher the optical depth is at that point. In the previous interim report from 21 March we pointed out that under dry aerosol conditions, even at extremely high concentrations, the optical depth at a 3 km range is in most cases not high enough to keep the influence of the BV sufficiently low. Increasing the lidar range is not always applicable due to the signal-to-noise ratio, rapidly increasing with distance. In such cases, therefore, a BV more or less close to reality must be found. If the spatial aerosol distribution is sufficiently *homogeneous*, the slope or average slope of the range-corrected backscatter profile may be used for this purpose. In our case, we have the advantage to operate an unmanned measuring station for meteorological and aerosol data at a mountain peak at 1650 m altitude above MSL, 2.55 km apart from the Institute, in connection with an atmospheric transmission path. The station can be switched on and off by a radio signal. Aerosol size distributions are measured by a Knollenberg classical scattering aerosol spectrometer, Model PDS-200. From the measured particle size spectra, extinction coefficients as a function of wavelength can be calculated using van de Hulst's approximation formula. On July 14, the particle spectrometer was operated during the lidar measurements, and extinction coefficients were calculated for the lidar wavelengths. Fig. 1 presents an original lidar return in 694 nm (ruby laser) wavelength, normalized with respect to transient recorder input range and laser energy but not to range, i.e. the curve is proportional to the electrical signal from the photodetector

(the peak near the end of the range is the reflex from a mountain face). The profile was calculated by the new program mentioned in Chapter 2, displayed on a graphic terminal screen and hardcopied. At the upper left corner are given the profile identifier, composed of a two-digit series number, a wavelength code (A), and the date, and, below it, the maximum abscissa (range) and ordinate values. The ordinate units here are volts/Joule. A listing of the digitized profile amplitude as function of range in meters is presented in Table 1 in the appendix. In this table the data proceed linewise (horizontally) with distance. Each line contains six pairs of distance (in m) and amplitude values; the amplitudes in this case are the digital numbers delivered by the transient recorder (or the sum of them, if more than one signal is averaged) minus the background level, without any normalization factor. The format of the lines is described by the FORTRAN-statement FORMAT(6(F7.1,I5)). In this presentation mode the limited amplitude resolution of the signal digitizer remains clearly evident. The whole table is stored as a data file in the disc memory of the computer in the same format, i.e. one line with six data pairs is one record. The transfer to other carriers, e.g. magnetic tape, is thus very simple by calling a special service program. The example is a lidar return from a homogeneous atmosphere; a return from an inhomogeneous cloud is listed in Table 2, it is the example discussed in the 1st interim report from February 10, 1983.

Fig. 2 shows the range corrected backscatter profile calculated from the lidar return Fig. 1; since calibration factors are known for each wavelength, the profile amplitude, presenting the product $\beta \cdot \tau^2$ (β=backscatter coefficient, τ=transmissivity factor), can be given in absolute units, $m^{-1}sterad^{-1}$. In the upper left corner again are shown the identifier and the abscissa and ordinate maxima, XM and YM, respectively.

For some purposes a logarithmic plot of the range-corrected profile is desirable. In Fig. 3 our profile is presented in such a way, where the decadic logarithm has been chosen. The full ordinate range is one decade in linear scale or unity in logarithmic scale, as indicated in the upper left corner. The nearly linear decay of the lidar profile in this presentation indicated almost homogeneous aerosol conditions, and an average extinction coefficient .315 km^{-1} is easily derived.

As already mentioned above, for our example we have aerosol concentration and size distribution data from the far end of the lidar range interval, which can be used for the derivation of the Klett boundary value. Fig. 4 shows hourly averaged particle size distribution curves measured near the end of the lidar range by an optical sprectrometer. The size range is .32 to 20 microns in diameter. From the spectrum closest to the time of the lidar measurement, van de Hulst's approximation results in an extinction coefficient of 1.57 km^{-1} for the ruby wavelength, where a refractive index of 1.419-.0331i was assumed, according to Shettle & Fenn's urban aerosol model at a relative humidity of 80% as measured. If we use the extinction coefficient just mentioned and apply Klett's method to our lidar profile, we get the extinction coefficient profile shown by the solid curve in Fig. 5. The dashed line is the optical depth as function of range. Above left are given the file identifier as before, the maximum abscissa value (3000 m in this case), the ordinate maxima for extinction coefficient (YMS) and the optical depth (YMT), the chosen value of the exponent Q in the exponential relation between backscatter and extinction coefficients (here: 1), the reference distance REFD, and the boundary value SR.

We see in Fig. 5 that the BV calculated from the measured aerosol data is obviously too high, as indicated by the unrealistic increase of the extinction coefficient towards the end

of the interval. Actually the sprectrometer-derived extinction is almost five times higher than the slope value. The reason for this discrepancy, which was observed in other cases, too, is not yet known. A local enhancement of particle size at the spectrometer site due to cloud formation or precondensation is improbable, since the measured relative humidity never exceeded 80%. Nevertheless, the extinction coefficient derived from aerosol data assessed at ground level is much smaller than that from the rear end of the lidar range interval, namely .185 km^{-1}, calculated from optical spectrometer data and .175 km^{-1}, calculated from impactor data. These values are even smaller than the extinction coefficient derived from the lidar profile slope. Further investigations seem to be required in the future to find the reason for these discrepancies.

If the Klett method is applied with the slope extinction coefficient as BV, the profile presented in Fig. 6 is obtained. As expected, a nearly constant extinction coefficient results. The same is true if the standard or CRBV method is applied with that boundary value at the near end of the interval, as shown in Fig. 7. The meaning of the solid and dashed curves is the same as before. Above left are printed the identifier, the close and far ends of the range interval, XR and XE, the coordinate maxima for range, extinction coefficient and optical depth, XM, YMS and YNT, respectively, the exponent Q, and the boundary value SR, here valid for range XR.

A comparison of Figs. 6 and 7 suggests both methods to be equivalent for lidar returns from a homogeneous atmosphere. However, the Klett method is still superior in so far that the choice of the BV is much less critical.

The extinction and optical depth profiles obtained by the Klett and CRBV methods may be stored permanently as data files in the

disc memory of the computer. Since these files are very extensive, we present in the appendix, Table 3, only the beginning of such a file, here, the Klett profile shown in Fig. 5. The first line contains the maximum number of profile data points and the maximum extinction coefficient and optical depth, the second one the reference distance in m, the boundary value in m^{-1}, and the exponent Q. The lines following contain the range in m, the extinction coefficient in m^{-1}, and the optical depth.

5. Future Plans

The soft-ware is now complete except some improvements like plotting of coordinate scales in the diagrams. One of the tasks of this contract work is the examination of the appropriateness of the relationship

$$\beta(r) = a \cdot \sigma(r)^q \ .$$

Only if this relationship is valid an analytical solution of the lidar equation exists. The examination of the validity is somewhat difficult. A possible way to do this is to correlate the absolute lidar amplitudes close to the lidar, where the extinction can be neglected, with extinction coefficients at the same range, calculated by any appropriate method. For this purpose as many as possible measurements are required, during fog and cloud conditions from <u>within</u> the fog. This is necessary to get absolute fog backscatter data. In order to get such data it will be necessary to go with the lidar to sites where ground fog is more frequent than at our Institute. Such places exist in the plains outside of our valley, e.g. in the "Murnauer Moor" or in other areas not too far from here. Since only a part of such excursions can be expected to be fully successful, it is doubtful that this task on the basis of experiments, data evaluation, and theoretical work can be finished during the current contract.

On the other hand, the lidar shots close to the aerosol spectrometer at the mountain station should be continued to find out whether a general discrepancy exists between spectrometer- and lidar-derived extinction coefficients.

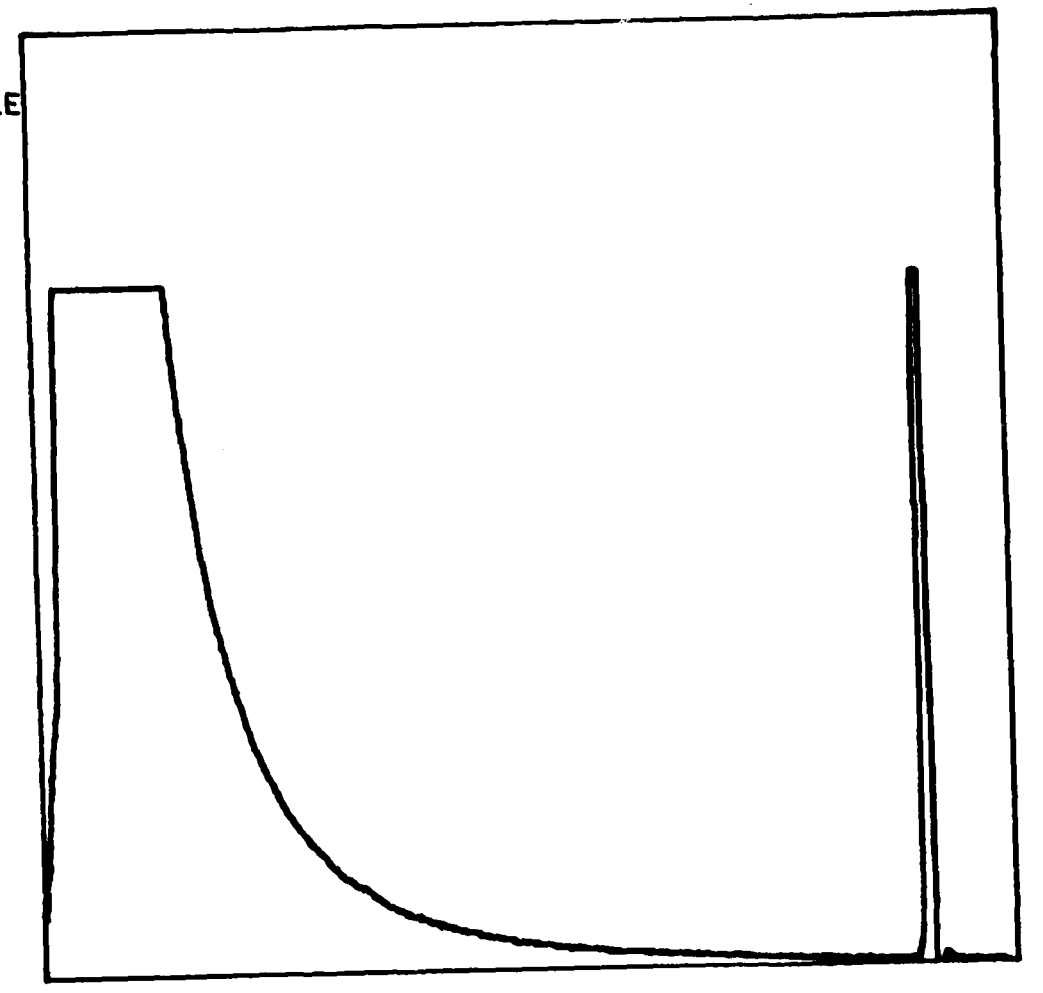
Garmisch-Partenkirchen, September 8, 1983

(Dr. R. Reiter)
Director

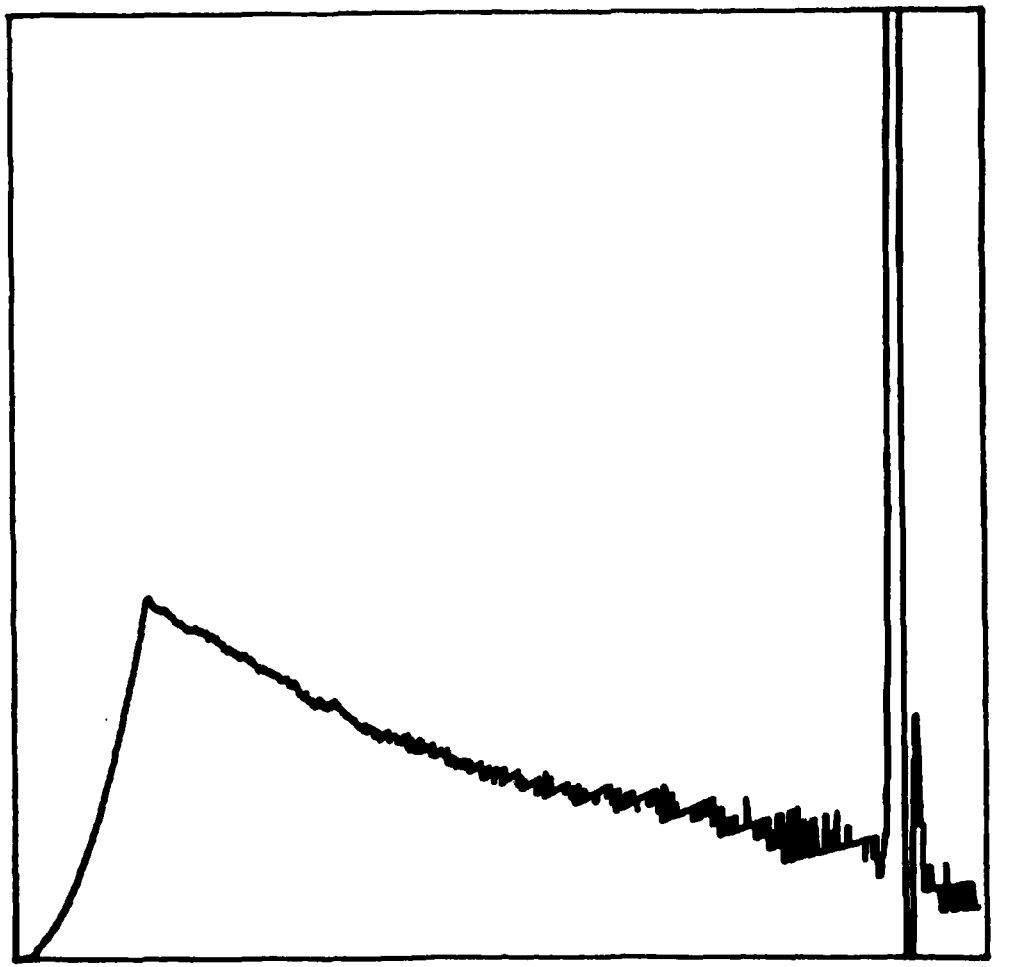
FIGURES 1-7

10A140783
XM=3000.0 M
YM=0.5E 03 V/JOULE

Fig.1

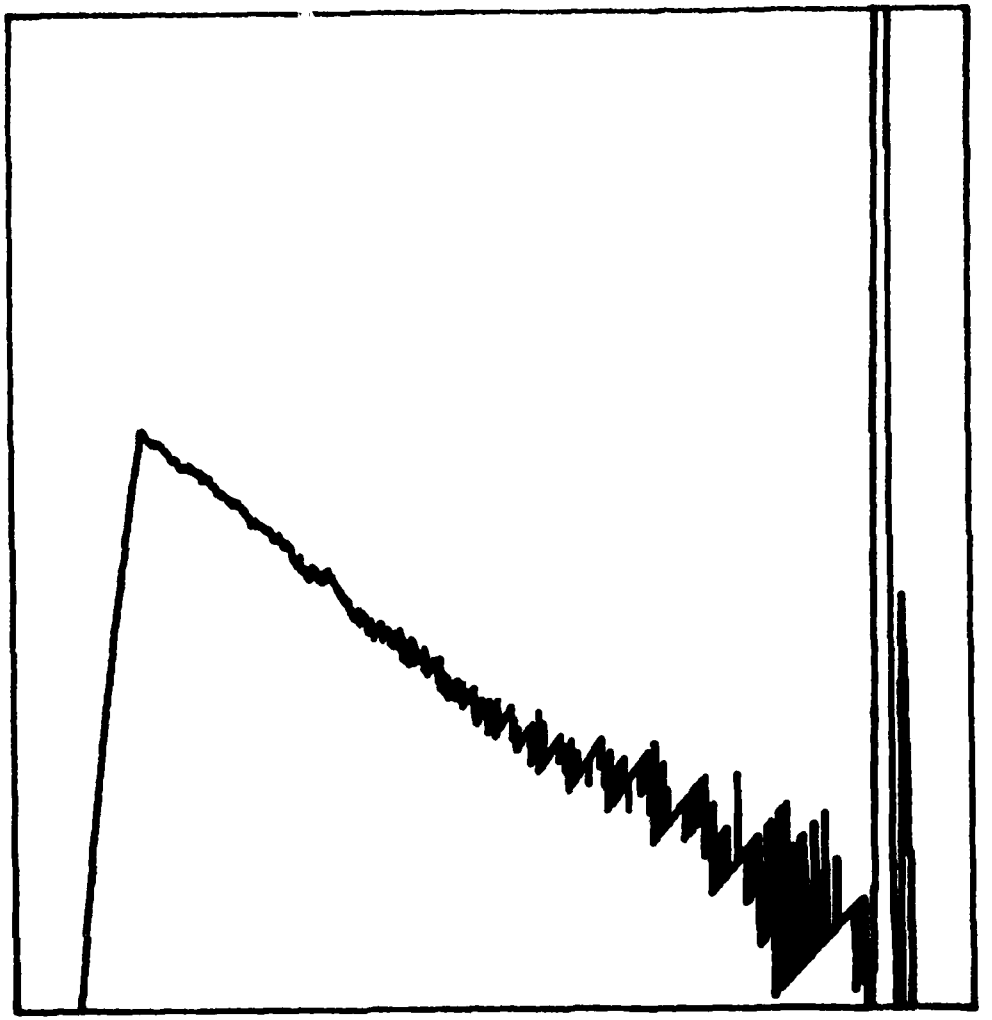


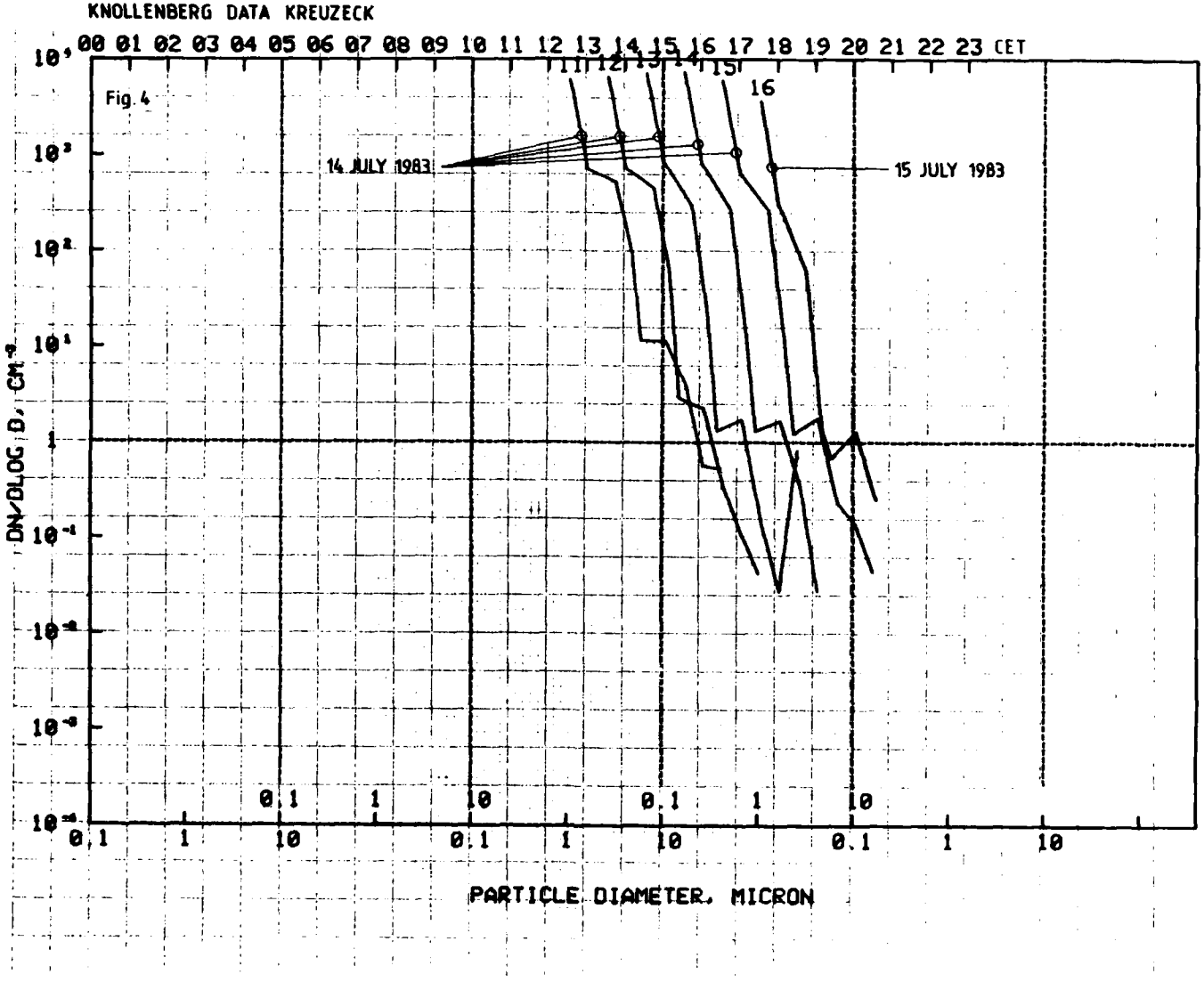
10A140783
XM=3000.0 M
YM=0.1E-04 1/M
Fig.2



10A140783
XM=3000.0 M
LOG10(YMIN)=-6.0
LOG10(YMAX)=-5.0

Fig.3



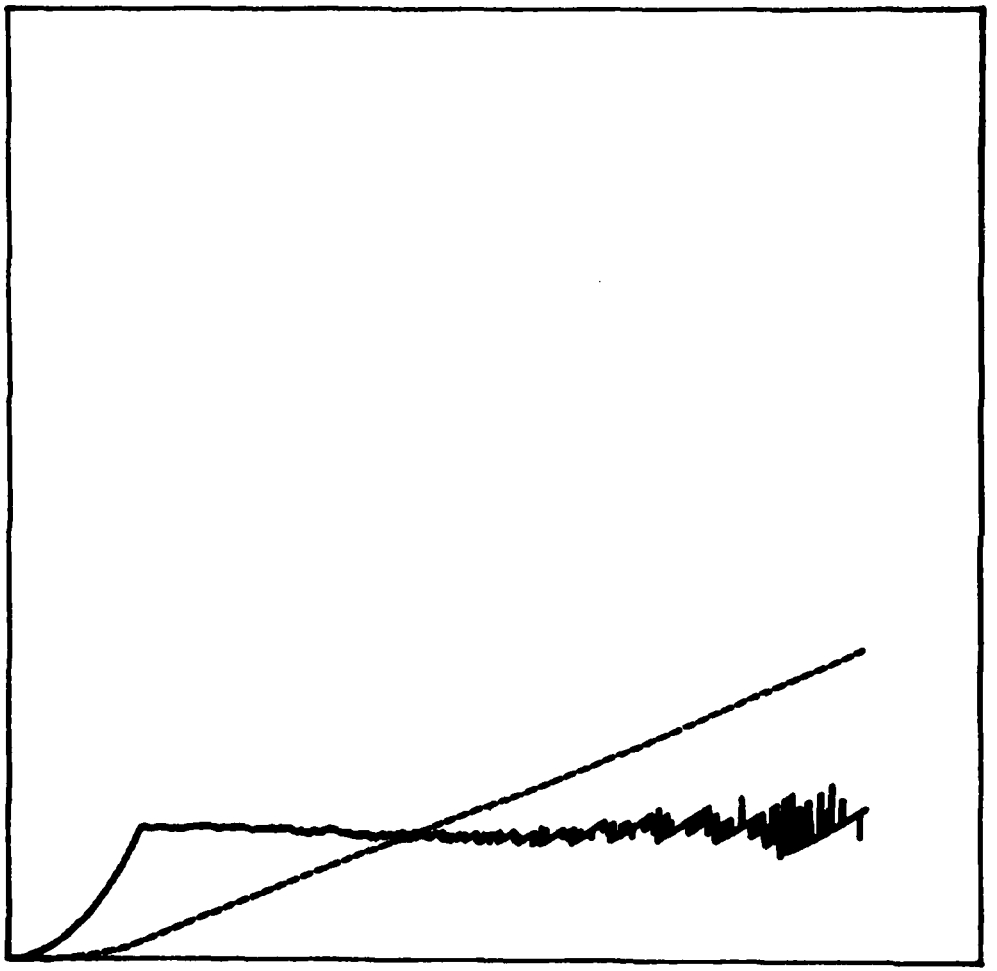

KNOLLENBERG DATA KREUZECK
Fig. 4
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 CET
11 12 13 14 15 16
14 JULY 1983
15 JULY 1983
DN/DLOG D, CM⁻³
PARTICLE DIAMETER, MICRON

10A140783
XM=3000.0 M
YMS=0.2E-02 1/M
YMT=0.2E 01
Q=0.1000E 01
REFD=2650.0 M
SR=0.1570E-02 1/M

Fig.5

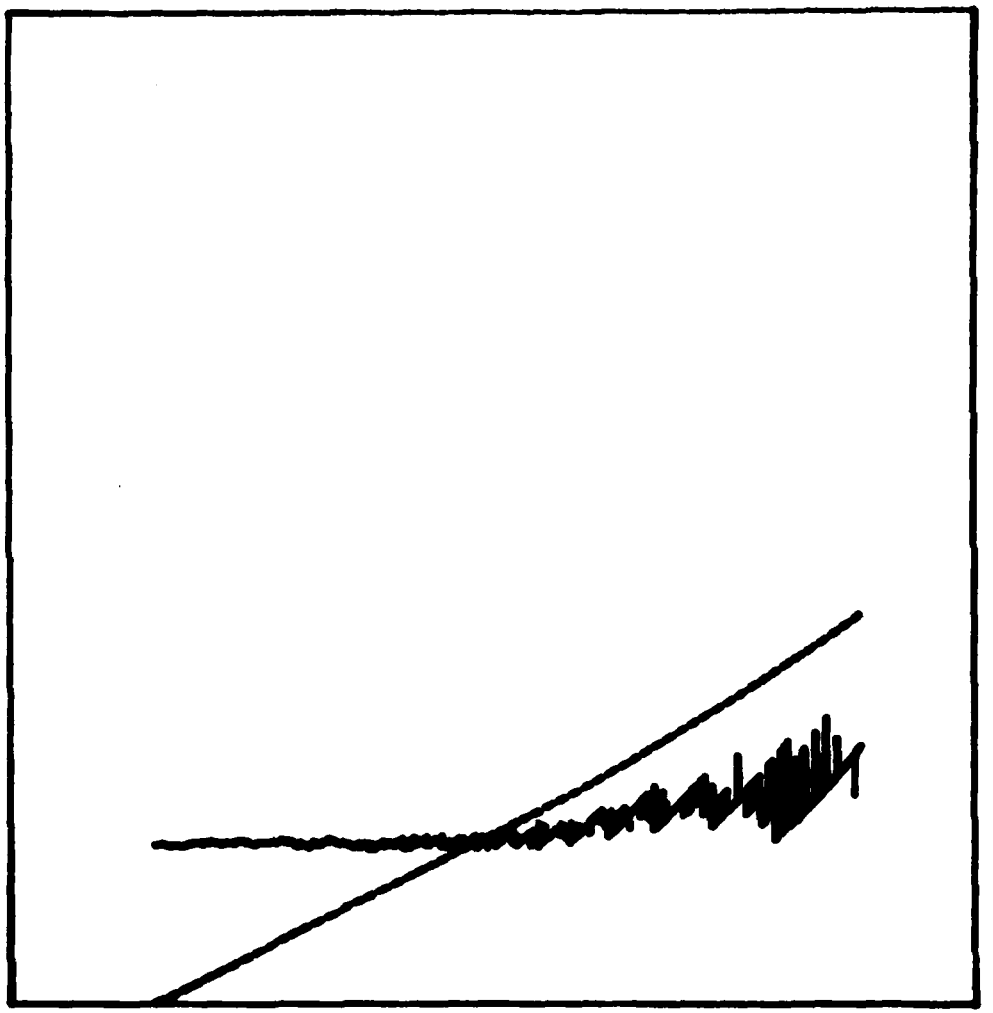
10A140783
XM=3000.0 M
YMS=0.2E-02 1/M
YMT=0.2E 01
Q=0.1000E 01
REFD=2650.0 M
SR=0.3150E-03 1/M

Fig.6



10A140783
XR= 450.0 M
XE=2649.0 M
XM=3000.0 M
YMS=0.2E-02 1/M
YMT=0.2E 01
Q=0.1000E 01
SR=0.3150E-03 1/M

Fig.7



APPENDIX

TABLES 1-3

TABLE 1

TABLE 1

1.5	66	3.0	96	4.5	90	6.0	65	7.5	81	9.0	72
10.5	88	12.0	113	13.5	109	15.0	111	16.5	120	18.0	121
19.5	125	21.0	152	22.5	145	24.0	148	25.5	153	27.0	168
28.5	185	30.0	208	31.5	213	33.0	225	34.5	225	36.0	226
37.5	240	39.0	244	40.5	249	42.0	266	43.5	265	45.0	268
46.5	272	48.0	276	49.5	285	51.0	290	52.5	294	54.0	303
55.5	319	57.0	336	58.5	353	60.0	391	61.5	425	63.0	465
64.5	551	66.0	615	67.5	664	69.0	720	70.5	743	72.0	751
73.5	751	75.0	751	76.5	751	78.0	751	79.5	751	81.0	751
82.5	751	84.0	751	85.5	751	87.0	751	88.5	751	90.0	751
91.5	751	93.0	751	94.5	751	96.0	751	97.5	751	99.0	751
100.5	751	102.0	751	103.5	751	105.0	751	106.5	751	108.0	751
109.5	751	111.0	751	112.5	751	114.0	751	115.5	751	117.0	751
118.5	751	120.0	751	121.5	751	123.0	751	124.5	751	126.0	751
127.5	751	129.0	751	130.5	751	132.0	751	133.5	751	135.0	751
136.5	751	138.0	751	139.5	751	141.0	751	142.5	751	144.0	751
145.5	751	147.0	751	148.5	751	150.0	751	151.5	751	153.0	751
154.5	751	156.0	751	157.5	751	159.0	751	160.5	751	162.0	751
163.5	751	165.0	751	166.5	751	168.0	751	169.5	751	171.0	751
172.5	751	174.0	751	175.5	751	177.0	751	178.5	751	180.0	751
181.5	751	183.0	751	184.5	751	186.0	751	187.5	751	189.0	751
190.5	751	192.0	751	193.5	751	195.0	751	196.5	751	198.0	751
199.5	751	201.0	751	202.5	751	204.0	751	205.5	751	207.0	751
208.5	751	210.0	751	211.5	751	213.0	751	214.5	751	216.0	751
217.5	751	219.0	751	220.5	751	222.0	751	223.5	751	225.0	751
226.5	751	228.0	751	229.5	751	231.0	751	232.5	751	234.0	751
235.5	751	237.0	751	238.5	751	240.0	751	241.5	751	243.0	751
244.5	751	246.0	751	247.5	751	249.0	751	250.5	751	252.0	751
253.5	751	255.0	751	256.5	751	258.0	751	259.5	751	261.0	751
262.5	751	264.0	751	265.5	751	267.0	751	268.5	751	270.0	751
271.5	751	273.0	751	274.5	751	276.0	751	277.5	751	279.0	751
280.5	751	282.0	751	283.5	751	285.0	751	286.5	751	288.0	751
289.5	751	291.0	751	292.5	751	294.0	751	295.5	751	297.0	751
298.5	751	300.0	751	301.5	751	303.0	751	304.5	751	306.0	751
307.5	751	309.0	751	310.5	751	312.0	751	313.5	751	315.0	751
316.5	751	318.0	751	319.5	751	321.0	751	322.5	751	324.0	751
325.5	751	327.0	751	328.5	751	330.0	751	331.5	751	333.0	751
334.5	751	336.0	751	337.5	751	339.0	751	340.5	751	342.0	751
343.5	751	345.0	751	346.5	751	348.0	751	349.5	751	351.0	751
352.5	751	354.0	751	355.5	751	357.0	751	358.5	751	360.0	751
361.5	751	363.0	751	364.5	751	366.0	751	367.5	751	369.0	751
370.5	751	372.0	751	373.5	751	375.0	751	376.5	751	378.0	751
379.5	751	381.0	751	382.5	751	384.0	751	385.5	751	387.0	751
388.5	751	390.0	751	391.5	751	393.0	751	394.5	751	396.0	751
397.5	751	399.0	751	400.5	751	402.0	751	403.5	751	405.0	751
406.5	751	408.0	751	409.5	751	411.0	747	412.5	740	414.0	736
415.5	733	417.0	725	418.5	720	420.0	710	421.5	707	423.0	698
424.5	696	426.0	686	427.5	683	429.0	674	430.5	668	432.0	661
433.5	657	435.0	653	436.5	649	438.0	644	439.5	637	441.0	633
442.5	628	444.0	621	445.5	619	447.0	613	448.5	608	450.0	600
451.5	601	453.0	596	454.5	592	456.0	587	457.5	585	459.0	584
460.5	580	462.0	574	463.5	572	465.0	565	466.5	561	468.0	557
469.5	553	471.0	553	472.5	545	474.0	541	475.5	537	477.0	533
478.5	529	480.0	525	481.5	522	483.0	519	484.5	513	486.0	510
487.5	507	489.0	504	490.5	498	492.0	496	493.5	492	495.0	487
496.5	484	498.0	477	499.5	474	501.0	472	502.5	469	504.0	465
505.5	464	507.0	460	508.5	455	510.0	453	511.5	452	513.0	450
514.5	447	516.0	442	517.5	441	519.0	439	520.5	434	522.0	430
523.5	427	525.0	425	526.5	422	528.0	417	529.5	415	531.0	412
532.5	408	534.0	405	535.5	404	537.0	402	538.5	400	540.0	396
541.5	395	543.0	395	544.5	392	546.0	387	547.5	385	549.0	384
550.5	383	552.0	380	553.5	377	555.0	375	556.5	375	558.0	372
559.5	372	561.0	371	562.5	368	564.0	364	565.5	360	567.0	360

TABLE 1

568.5	357	570.0	356	571.5	355	573.0	353	574.5	349	576.0	348
577.5	344	579.0	344	580.5	343	582.0	338	583.5	337	585.0	336
586.5	332	588.0	330	589.5	329	591.0	327	592.5	326	594.0	324
595.5	323	597.0	323	598.5	314	600.0	314	601.5	313	603.0	313
604.5	312	606.0	311	607.5	306	609.0	304	610.5	303	612.0	301
613.5	300	615.0	299	616.5	298	618.0	294	619.5	294	621.0	293
622.5	290	624.0	290	625.5	290	627.0	284	628.5	283	630.0	281
631.5	280	633.0	278	634.5	277	636.0	275	637.5	274	639.0	271
640.5	270	642.0	268	643.5	268	645.0	267	646.5	261	648.0	261
649.5	261	651.0	258	652.5	257	654.0	256	655.5	255	657.0	252
658.5	250	660.0	249	661.5	249	663.0	248	664.5	248	666.0	246
667.5	243	669.0	243	670.5	242	672.0	240	673.5	239	675.0	237
676.5	237	678.0	235	679.5	234	681.0	233	682.5	231	684.0	229
685.5	229	687.0	228	688.5	226	690.0	226	691.5	224	693.0	224
694.5	223	696.0	219	697.5	219	699.0	219	700.5	218	702.0	217
703.5	216	705.0	216	706.5	213	708.0	212	709.5	212	711.0	212
712.5	210	714.0	209	715.5	209	717.0	206	718.5	205	720.0	205
721.5	203	723.0	202	724.5	201	726.0	201	727.5	200	729.0	197
730.5	196	732.0	195	733.5	194	735.0	194	736.5	194	738.0	191
739.5	190	741.0	189	742.5	188	744.0	187	745.5	186	747.0	185
748.5	184	750.0	183	751.5	181	753.0	180	754.5	178	756.0	178
757.5	177	759.0	177	760.5	176	762.0	175	763.5	175	765.0	174
766.5	174	768.0	174	769.5	172	771.0	172	772.5	170	774.0	170
775.5	168	777.0	168	778.5	167	780.0	166	781.5	165	783.0	165
784.5	165	786.0	163	787.5	162	789.0	162	790.5	162	792.0	161
793.5	160	795.0	159	796.5	158	798.0	157	799.5	157	801.0	157
802.5	156	804.0	154	805.5	154	807.0	153	808.5	153	810.0	152
811.5	151	813.0	151	814.5	151	816.0	150	817.5	150	819.0	148
820.5	147	822.0	146	823.5	145	825.0	144	826.5	144	828.0	143
829.5	142	831.0	142	832.5	142	834.0	141	835.5	141	837.0	140
838.5	139	840.0	139	841.5	139	843.0	139	844.5	139	846.0	137
847.5	136	849.0	136	850.5	133	852.0	133	853.5	133	855.0	133
856.5	133	858.0	132	859.5	131	861.0	131	862.5	129	864.0	130
865.5	130	867.0	129	868.5	129	870.0	128	871.5	126	873.0	126
874.5	126	876.0	125	877.5	125	879.0	123	880.5	121	882.0	121
883.5	120	885.0	119	886.5	119	888.0	118	889.5	118	891.0	117
892.5	117	894.0	115	895.5	115	897.0	115	898.5	115	900.0	115
901.5	115	903.0	115	904.5	115	906.0	112	907.5	111	909.0	111
910.5	110	912.0	110	913.5	109	915.0	109	916.5	108	918.0	108
919.5	108	921.0	107	922.5	107	924.0	107	925.5	105	927.0	104
928.5	104	930.0	103	931.5	103	933.0	103	934.5	103	936.0	103
937.5	103	939.0	103	940.5	102	942.0	102	943.5	103	945.0	103
946.5	102	948.0	100	949.5	100	951.0	99	952.5	99	954.0	100
955.5	98	957.0	98	958.5	98	960.0	97	961.5	96	963.0	96
964.5	96	966.0	95	967.5	95	969.0	95	970.5	94	972.0	95
973.5	95	975.0	95	976.5	94	978.0	94	979.5	94	981.0	94
982.5	93	984.0	92	985.5	92	987.0	93	988.5	93	990.0	93
991.5	92	993.0	91	994.5	90	996.0	90	997.5	90	999.0	90
1000.5	89	1002.0	89	1003.5	89	1005.0	89	1006.5	87	1008.0	87
1009.5	87	1011.0	86	1012.5	86	1014.0	85	1015.5	85	1017.0	84
1018.5	84	1020.0	84	1021.5	83	1023.0	83	1024.5	82	1026.0	82
1027.5	81	1029.0	81	1030.5	81	1032.0	81	1033.5	81	1035.0	80
1036.5	79	1038.0	79	1039.5	79	1041.0	79	1042.5	78	1044.0	78
1045.5	77	1047.0	77	1048.5	77	1050.0	76	1051.5	76	1053.0	76
1054.5	76	1056.0	76	1057.5	75	1059.0	74	1060.5	74	1062.0	73
1063.5	73	1065.0	73	1066.5	73	1068.0	72	1069.5	72	1071.0	71
1072.5	71	1074.0	71	1075.5	71	1077.0	71	1078.5	71	1080.0	70
1081.5	70	1083.0	69	1084.5	69	1086.0	69	1087.5	69	1089.0	70
1090.5	69	1092.0	68	1093.5	67	1095.0	67	1096.5	67	1098.0	67
1099.5	68	1101.0	67	1102.5	67	1104.0	67	1105.5	67	1107.0	66
1108.5	66	1110.0	66	1111.5	66	1113.0	65	1114.5	64	1116.0	63
1117.5	63	1119.0	63	1120.5	64	1122.0	64	1123.5	64	1125.0	62
1126.5	62	1128.0	62	1129.5	63	1131.0	62	1132.5	62	1134.0	61
1135.5	60	1137.0	60	1138.5	61	1140.0	61	1141.5	61	1143.0	60

TABLE 1

1144.5	60	1146.0	60	1147.5	60	1149.0	60	1150.5	60	1152.0	60
1153.5	60	1155.0	60	1156.5	60	1158.0	60	1159.5	58	1161.0	58
1162.5	57	1164.0	57	1165.5	58	1167.0	57	1168.5	57	1170.0	57
1171.5	57	1173.0	57	1174.5	57	1176.0	57	1177.5	57	1179.0	57
1180.5	56	1182.0	56	1183.5	56	1185.0	56	1186.5	55	1188.0	55
1189.5	54	1191.0	54	1192.5	54	1194.0	54	1195.5	54	1197.0	53
1198.5	53	1200.0	53	1201.5	53	1203.0	54	1204.5	54	1206.0	54
1207.5	53	1209.0	53	1210.5	52	1212.0	52	1213.5	52	1215.0	51
1216.5	51	1218.0	52	1219.5	53	1221.0	53	1222.5	52	1224.0	50
1225.5	49	1227.0	49	1228.5	51	1230.0	51	1231.5	50	1233.0	50
1234.5	50	1236.0	48	1237.5	48	1239.0	48	1240.5	49	1242.0	49
1243.5	48	1245.0	47	1246.5	48	1248.0	48	1249.5	48	1251.0	48
1252.5	49	1254.0	49	1255.5	49	1257.0	48	1258.5	47	1260.0	46
1261.5	47	1263.0	47	1264.5	48	1266.0	46	1267.5	46	1269.0	46
1270.5	46	1272.0	46	1273.5	46	1275.0	46	1276.5	46	1278.0	45
1279.5	45	1281.0	45	1282.5	45	1284.0	45	1285.5	45	1287.0	45
1288.5	45	1290.0	45	1291.5	44	1293.0	43	1294.5	43	1296.0	45
1297.5	45	1299.0	44	1300.5	43	1302.0	42	1303.5	42	1305.0	42
1306.5	42	1308.0	42	1309.5	42	1311.0	42	1312.5	42	1314.0	42
1315.5	42	1317.0	42	1318.5	42	1320.0	42	1321.5	42	1323.0	42
1324.5	42	1326.0	41	1327.5	41	1329.0	41	1330.5	41	1332.0	41
1333.5	41	1335.0	40	1336.5	40	1338.0	39	1339.5	40	1341.0	40
1342.5	41	1344.0	39	1345.5	38	1347.0	39	1348.5	39	1350.0	39
1351.5	39	1353.0	39	1354.5	38	1356.0	38	1357.5	37	1359.0	38
1360.5	38	1362.0	38	1363.5	38	1365.0	38	1366.5	37	1368.0	36
1369.5	36	1371.0	36	1372.5	37	1374.0	37	1375.5	36	1377.0	36
1378.5	36	1380.0	36	1381.5	36	1383.0	36	1384.5	36	1386.0	36
1387.5	35	1389.0	35	1390.5	36	1392.0	36	1393.5	36	1395.0	36
1396.5	36	1398.0	35	1399.5	35	1401.0	35	1402.5	35	1404.0	34
1405.5	34	1407.0	35	1408.5	35	1410.0	35	1411.5	34	1413.0	33
1414.5	34	1416.0	34	1417.5	34	1419.0	34	1420.5	33	1422.0	33
1423.5	33	1425.0	33	1426.5	33	1428.0	33	1429.5	33	1431.0	33
1432.5	33	1434.0	33	1435.5	33	1437.0	33	1438.5	33	1440.0	33
1441.5	33	1443.0	32	1444.5	32	1446.0	33	1447.5	32	1449.0	31
1450.5	32	1452.0	32	1453.5	30	1455.0	30	1456.5	30	1458.0	30
1459.5	30	1461.0	30	1462.5	30	1464.0	30	1465.5	30	1467.0	30
1468.5	30	1470.0	30	1471.5	31	1473.0	31	1474.5	30	1476.0	30
1477.5	30	1479.0	30	1480.5	30	1482.0	30	1483.5	30	1485.0	30
1486.5	29	1488.0	29	1489.5	28	1491.0	30	1492.5	30	1494.0	30
1495.5	29	1497.0	29	1498.5	29	1500.0	29	1501.5	29	1503.0	29
1504.5	29	1506.0	29	1507.5	29	1509.0	29	1510.5	27	1512.0	27
1513.5	27	1515.0	27	1516.5	29	1518.0	29	1519.5	29	1521.0	28
1522.5	28	1524.0	27	1525.5	27	1527.0	27	1528.5	27	1530.0	27
1531.5	27	1533.0	27	1534.5	27	1536.0	27	1537.5	27	1539.0	27
1540.5	27	1542.0	27	1543.5	27	1545.0	27	1546.5	27	1548.0	27
1549.5	27	1551.0	27	1552.5	27	1554.0	27	1555.5	27	1557.0	27
1558.5	27	1560.0	27	1561.5	27	1563.0	27	1564.5	25	1566.0	25
1567.5	25	1569.0	26	1570.5	26	1572.0	25	1573.5	25	1575.0	25
1576.5	24	1578.0	24	1579.5	24	1581.0	24	1582.5	25	1584.0	25
1585.5	24	1587.0	24	1588.5	24	1590.0	24	1591.5	24	1593.0	24
1594.5	24	1596.0	24	1597.5	24	1599.0	24	1600.5	24	1602.0	24
1603.5	24	1605.0	24	1606.5	24	1608.0	24	1609.5	24	1611.0	24
1612.5	24	1614.0	24	1615.5	24	1617.0	24	1618.5	24	1620.0	23
1621.5	22	1623.0	22	1624.5	23	1626.0	24	1627.5	23	1629.0	23
1630.5	22	1632.0	22	1633.5	23	1635.0	23	1636.5	23	1638.0	23
1639.5	23	1641.0	22	1642.5	22	1644.0	21	1645.5	22	1647.0	24
1648.5	24	1650.0	23	1651.5	22	1653.0	21	1654.5	21	1656.0	21
1657.5	21	1659.0	21	1660.5	23	1662.0	23	1663.5	22	1665.0	21
1666.5	21	1668.0	21	1669.5	21	1671.0	21	1672.5	21	1674.0	21
1675.5	21	1677.0	21	1678.5	21	1680.0	21	1681.5	21	1683.0	21
1684.5	21	1686.0	21	1687.5	21	1689.0	21	1690.5	21	1692.0	21
1693.5	21	1695.0	21	1696.5	21	1698.0	21	1699.5	21	1701.0	21
1702.5	21	1704.0	21	1705.5	21	1707.0	20	1708.5	20	1710.0	20
1711.5	20	1713.0	21	1714.5	21	1716.0	21	1717.5	20	1719.0	20

TABLE 1

1720.5	20	1722.0	20	1723.5	20	1725.0	20	1726.5	20	1728.0	19
1729.5	19	1731.0	20	1732.5	20	1734.0	20	1735.5	20	1737.0	19
1738.5	18	1740.0	18	1741.5	18	1743.0	19	1744.5	19	1746.0	20
1747.5	19	1749.0	19	1750.5	18	1752.0	18	1753.5	18	1755.0	18
1756.5	18	1758.0	18	1759.5	18	1761.0	18	1762.5	18	1764.0	18
1765.5	19	1767.0	19	1768.5	18	1770.0	18	1771.5	18	1773.0	18
1774.5	18	1776.0	18	1777.5	18	1779.0	18	1780.5	18	1782.0	18
1783.5	18	1785.0	18	1786.5	18	1788.0	18	1789.5	18	1791.0	18
1792.5	18	1794.0	18	1795.5	18	1797.0	18	1798.5	18	1800.0	17
1801.5	17	1803.0	17	1804.5	18	1806.0	18	1807.5	18	1809.0	18
1810.5	18	1812.0	18	1813.5	18	1815.0	18	1816.5	18	1818.0	18
1819.5	18	1821.0	18	1822.5	18	1824.0	18	1825.5	18	1827.0	18
1828.5	18	1830.0	18	1831.5	18	1833.0	18	1834.5	18	1836.0	17
1837.5	17	1839.0	18	1840.5	18	1842.0	18	1843.5	18	1845.0	17
1846.5	17	1848.0	17	1849.5	17	1851.0	17	1852.5	16	1854.0	16
1855.5	17	1857.0	17	1858.5	17	1860.0	16	1861.5	15	1863.0	15
1864.5	15	1866.0	16	1867.5	16	1869.0	17	1870.5	17	1872.0	16
1873.5	15	1875.0	15	1876.5	15	1878.0	15	1879.5	15	1881.0	15
1882.5	15	1884.0	15	1885.5	15	1887.0	15	1888.5	15	1890.0	15
1891.5	16	1893.0	16	1894.5	15	1896.0	15	1897.5	15	1899.0	15
1900.5	16	1902.0	16	1903.5	16	1905.0	15	1906.5	15	1908.0	15
1909.5	15	1911.0	15	1912.5	16	1914.0	16	1915.5	15	1917.0	15
1918.5	15	1920.0	15	1921.5	15	1923.0	15	1924.5	15	1926.0	14
1927.5	14	1929.0	15	1930.5	15	1932.0	15	1933.5	15	1935.0	15
1936.5	15	1938.0	15	1939.5	15	1941.0	15	1942.5	15	1944.0	15
1945.5	15	1947.0	15	1948.5	15	1950.0	15	1951.5	15	1953.0	15
1954.5	15	1956.0	15	1957.5	15	1959.0	15	1960.5	15	1962.0	14
1963.5	15	1965.0	14	1966.5	14	1968.0	15	1969.5	15	1971.0	15
1972.5	14	1974.0	14	1975.5	14	1977.0	15	1978.5	15	1980.0	15
1981.5	15	1983.0	14	1984.5	14	1986.0	15	1987.5	15	1989.0	15
1990.5	14	1992.0	14	1993.5	13	1995.0	13	1996.5	13	1998.0	14
1999.5	14	2001.0	14	2002.5	13	2004.0	13	2005.5	12	2007.0	13
2008.5	15	2010.0	15	2011.5	14	2013.0	13	2014.5	12	2016.0	12
2017.5	12	2019.0	13	2020.5	13	2022.0	14	2023.5	14	2025.0	13
2026.5	12	2028.0	12	2029.5	12	2031.0	13	2032.5	13	2034.0	14
2035.5	13	2037.0	12	2038.5	12	2040.0	12	2041.5	12	2043.0	13
2044.5	13	2046.0	13	2047.5	12	2049.0	12	2050.5	12	2052.0	12
2053.5	12	2055.0	12	2056.5	12	2058.0	12	2059.5	12	2061.0	12
2062.5	12	2064.0	12	2065.5	12	2067.0	12	2068.5	12	2070.0	12
2071.5	12	2073.0	12	2074.5	12	2076.0	12	2077.5	12	2079.0	12
2080.5	12	2082.0	12	2083.5	12	2085.0	12	2086.5	12	2088.0	12
2089.5	12	2091.0	12	2092.5	12	2094.0	12	2095.5	12	2097.0	12
2098.5	12	2100.0	11	2101.5	11	2103.0	12	2104.5	12	2106.0	12
2107.5	12	2109.0	12	2110.5	12	2112.0	11	2113.5	11	2115.0	11
2116.5	11	2118.0	12	2119.5	12	2121.0	11	2122.5	11	2124.0	11
2125.5	12	2127.0	12	2128.5	12	2130.0	12	2131.5	12	2133.0	12
2134.5	11	2136.0	12	2137.5	12	2139.0	12	2140.5	12	2142.0	11
2143.5	11	2145.0	11	2146.5	11	2148.0	11	2149.5	11	2151.0	12
2152.5	12	2154.0	12	2155.5	11	2157.0	11	2158.5	11	2160.0	10
2161.5	11	2163.0	11	2164.5	12	2166.0	11	2167.5	11	2169.0	11
2170.5	11	2172.0	10	2173.5	10	2175.0	11	2176.5	11	2178.0	11
2179.5	11	2181.0	11	2182.5	9	2184.0	9	2185.5	9	2187.0	11
2188.5	11	2190.0	10	2191.5	10	2193.0	9	2194.5	10	2196.0	10
2197.5	10	2199.0	10	2200.5	10	2202.0	10	2203.5	9	2205.0	9
2206.5	10	2208.0	9	2209.5	9	2211.0	10	2212.5	10	2214.0	10
2215.5	9	2217.0	9	2218.5	9	2220.0	9	2221.5	9	2223.0	10
2224.5	10	2226.0	10	2227.5	9	2229.0	9	2230.5	10	2232.0	9
2233.5	9	2235.0	9	2236.5	9	2238.0	9	2239.5	9	2241.0	9
2242.5	9	2244.0	9	2245.5	9	2247.0	9	2248.5	9	2250.0	9
2251.5	9	2253.0	9	2254.5	9	2256.0	9	2257.5	9	2259.0	9
2260.5	9	2262.0	9	2263.5	11	2265.0	11	2266.5	10	2268.0	9
2269.5	9	2271.0	9	2272.5	9	2274.0	9	2275.5	9	2277.0	9
2278.5	9	2280.0	9	2281.5	9	2283.0	9	2284.5	9	2286.0	9
2287.5	9	2289.0	9	2290.5	9	2292.0	8	2293.5	9	2295.0	9

TABLE 1

2296.5	9	2298.0	9	2299.5	8	2301.0	8	2302.5	8	2304.0	8
2305.5	9	2307.0	9	2308.5	9	2310.0	9	2311.5	9	2313.0	9
2314.5	8	2316.0	9	2317.5	9	2319.0	9	2320.5	9	2322.0	8
2323.5	8	2325.0	9	2326.5	9	2328.0	9	2329.5	9	2331.0	9
2332.5	8	2334.0	7	2335.5	8	2337.0	8	2338.5	8	2340.0	8
2341.5	8	2343.0	8	2344.5	8	2346.0	7	2347.5	7	2349.0	7
2350.5	8	2352.0	8	2353.5	8	2355.0	8	2356.5	8	2358.0	8
2359.5	9	2361.0	9	2362.5	8	2364.0	8	2365.5	7	2367.0	8
2368.5	8	2370.0	8	2371.5	9	2373.0	8	2374.5	8	2376.0	8
2377.5	8	2379.0	6	2380.5	6	2382.0	6	2383.5	7	2385.0	8
2386.5	8	2388.0	8	2389.5	7	2391.0	7	2392.5	8	2394.0	9
2395.5	8	2397.0	8	2398.5	8	2400.0	6	2401.5	6	2403.0	7
2404.5	8	2406.0	9	2407.5	8	2409.0	8	2410.5	7	2412.0	6
2413.5	6	2415.0	8	2416.5	8	2418.0	9	2419.5	8	2421.0	8
2422.5	6	2424.0	6	2425.5	6	2427.0	6	2428.5	7	2430.0	8
2431.5	8	2433.0	7	2434.5	7	2436.0	6	2437.5	7	2439.0	8
2440.5	8	2442.0	8	2443.5	8	2445.0	6	2446.5	6	2448.0	6
2449.5	6	2451.0	7	2452.5	7	2454.0	6	2455.5	6	2457.0	6
2458.5	6	2460.0	7	2461.5	7	2463.0	8	2464.5	8	2466.0	6
2467.5	6	2469.0	7	2470.5	7	2472.0	8	2473.5	8	2475.0	7
2476.5	7	2478.0	6	2479.5	6	2481.0	6	2482.5	6	2484.0	6
2485.5	6	2487.0	6	2488.5	6	2490.0	6	2491.5	6	2493.0	6
2494.5	6	2496.0	6	2497.5	6	2499.0	6	2500.5	6	2502.0	6
2503.5	7	2505.0	8	2506.5	8	2508.0	6	2509.5	6	2511.0	6
2512.5	6	2514.0	7	2515.5	7	2517.0	6	2518.5	6	2520.0	6
2521.5	6	2523.0	6	2524.5	6	2526.0	6	2527.5	6	2529.0	6
2530.5	7	2532.0	7	2533.5	6	2535.0	6	2536.5	6	2538.0	8
2539.5	8	2541.0	7	2542.5	6	2544.0	6	2545.5	6	2547.0	6
2548.5	6	2550.0	6	2551.5	6	2553.0	6	2554.5	6	2556.0	6
2557.5	6	2559.0	6	2560.5	6	2562.0	6	2563.5	6	2565.0	6
2566.5	6	2568.0	6	2569.5	6	2571.0	6	2572.5	7	2574.0	7
2575.5	6	2577.0	6	2578.5	6	2580.0	6	2581.5	6	2583.0	6
2584.5	6	2586.0	6	2587.5	6	2589.0	6	2590.5	6	2592.0	6
2593.5	6	2595.0	6	2596.5	6	2598.0	6	2599.5	6	2601.0	6
2602.5	6	2604.0	6	2605.5	6	2607.0	6	2608.5	6	2610.0	6
2611.5	6	2613.0	6	2614.5	6	2616.0	6	2617.5	6	2619.0	6
2620.5	6	2622.0	6	2623.5	6	2625.0	6	2626.5	6	2628.0	5
2629.5	6	2631.0	6	2632.5	6	2634.0	6	2635.5	6	2637.0	6
2638.5	6	2640.0	6	2641.5	6	2643.0	6	2644.5	6	2646.0	6
2647.5	6	2649.0	6	2650.5	5	2652.0	5	2653.5	6	2655.0	6
2656.5	6	2658.0	6	2659.5	6	2661.0	5	2662.5	5	2664.0	5
2665.5	5	2667.0	4	2668.5	5	2670.0	5	2671.5	5	2673.0	5
2674.5	5	2676.0	5	2677.5	4	2679.0	5	2680.5	5	2682.0	5
2683.5	5	2685.0	5	2686.5	6	2688.0	6	2689.5	6	2691.0	6
2692.5	8	2694.0	9	2695.5	9	2697.0	13	2698.5	14	2700.0	18
2701.5	20	2703.0	21	2704.5	24	2706.0	49	2707.5	71	2709.0	161
2710.5	328	2712.0	504	2713.5	634	2715.0	743	2716.5	751	2718.0	751
2719.5	751	2721.0	751	2722.5	751	2724.0	751	2725.5	751	2727.0	751
2728.5	751	2730.0	751	2731.5	751	2733.0	751	2734.5	751	2736.0	751
2737.5	649	2739.0	487	2740.5	353	2742.0	282	2743.5	193	2745.0	121
2746.5	64	2748.0	32	2749.5	6	2751.0	-10	2752.5	-14	2754.0	-14
2755.5	-14	2757.0	-14	2758.5	-14	2760.0	-14	2761.5	-14	2763.0	-14
2764.5	-14	2766.0	-14	2767.5	-8	2769.0	-3	2770.5	-1	2772.0	2
2773.5	5	2775.0	7	2776.5	9	2778.0	9	2779.5	10	2781.0	11
2782.5	11	2784.0	11	2785.5	11	2787.0	9	2788.5	9	2790.0	9
2791.5	8	2793.0	8	2794.5	7	2796.0	6	2797.5	6	2799.0	6
2800.5	6	2802.0	6	2803.5	5	2805.0	4	2806.5	3	2808.0	3
2809.5	3	2811.0	3	2812.5	3	2814.0	3	2815.5	4	2817.0	3
2818.5	3	2820.0	3	2821.5	3	2823.0	3	2824.5	3	2826.0	3
2827.5	4	2829.0	4	2830.5	3	2832.0	3	2833.5	3	2835.0	3
2836.5	3	2838.0	3	2839.5	3	2841.0	3	2842.5	3	2844.0	3
2845.5	3	2847.0	3	2848.5	3	2850.0	3	2851.5	3	2853.0	3
2854.5	3	2856.0	3	2857.5	3	2859.0	2	2860.5	2	2862.0	3
2863.5	3	2865.0	3	2866.5	3	2868.0	3	2869.5	3	2871.0	2

TABLE 1

2872.5	2	2874.0	3	2875.5	3	2877.0	4	2878.5	3	2880.0	3
2881.5	3	2883.0	3	2884.5	3	2886.0	3	2887.5	3	2889.0	3
2890.5	3	2892.0	3	2893.5	2	2895.0	2	2896.5	2	2898.0	2
2899.5	2	2901.0	2	2902.5	2	2904.0	2	2905.5	2	2907.0	3
2908.5	3	2910.0	3	2911.5	3	2913.0	3	2914.5	2	2916.0	2
2917.5	2	2919.0	3	2920.5	3	2922.0	3	2923.5	3	2925.0	2
2926.5	2	2928.0	2	2929.5	2	2931.0	2	2932.5	3	2934.0	3
2935.5	3	2937.0	3	2938.5	3	2940.0	2	2941.5	3	2943.0	3
2944.5	3	2946.0	3	2947.5	2	2949.0	2	2950.5	2	2952.0	2
2953.5	3	2955.0	3	2956.5	3	2958.0	2	2959.5	2	2961.0	2

TABLE 2

1.5	2	3.0	2	4.5	1	6.0	2	7.5	2	9.0	2
10.5	2	12.0	3	13.5	1	15.0	2	16.5	2	18.0	1
19.5	2	21.0	2	22.5	2	24.0	2	25.5	2	27.0	1
28.5	2	30.0	2	31.5	2	33.0	2	34.5	3	36.0	3
37.5	4	39.0	4	40.5	4	42.0	6	43.5	6	45.0	9
46.5	10	48.0	14	49.5	18	51.0	21	52.5	26	54.0	30
55.5	37	57.0	41	58.5	45	60.0	49	61.5	50	63.0	53
64.5	57	66.0	58	67.5	61	69.0	62	70.5	62	72.0	62
73.5	62	75.0	63	76.5	64	78.0	64	79.5	63	81.0	63
82.5	62	84.0	61	85.5	61	87.0	61	88.5	60	90.0	58
91.5	58	93.0	58	94.5	57	96.0	57	97.5	56	99.0	55
100.5	54	102.0	53	103.5	50	105.0	50	106.5	49	108.0	46
109.5	45	111.0	42	112.5	41	114.0	38	115.5	38	117.0	37
118.5	34	120.0	34	121.5	33	123.0	30	124.5	30	126.0	30
127.5	30	129.0	29	130.5	29	132.0	29	133.5	29	135.0	29
136.5	29	138.0	29	139.5	30	141.0	30	142.5	30	144.0	30
145.5	30	147.0	30	148.5	30	150.0	30	151.5	30	153.0	30
154.5	29	156.0	29	157.5	28	159.0	27	160.5	26	162.0	25
163.5	25	165.0	25	166.5	23	168.0	22	169.5	22	171.0	21
172.5	21	174.0	21	175.5	20	177.0	19	178.5	19	180.0	19
181.5	18	183.0	18	184.5	17	186.0	17	187.5	17	189.0	17
190.5	17	192.0	16	193.5	16	195.0	15	196.5	15	198.0	15
199.5	14	201.0	14	202.5	14	204.0	13	205.5	13	207.0	13
208.5	13	210.0	13	211.5	12	213.0	12	214.5	11	216.0	11
217.5	11	219.0	11	220.5	11	222.0	10	223.5	10	225.0	10
226.5	10	228.0	10	229.5	9	231.0	9	232.5	9	234.0	9
235.5	9	237.0	9	238.5	8	240.0	8	241.5	8	243.0	8
244.5	8	246.0	7	247.5	7	249.0	7	250.5	7	252.0	7
253.5	7	255.0	7	256.5	7	258.0	7	259.5	7	261.0	7
262.5	7	264.0	7	265.5	7	267.0	7	268.5	7	270.0	7
271.5	7	273.0	7	274.5	7	276.0	7	277.5	6	279.0	6
280.5	6	282.0	6	283.5	6	285.0	6	286.5	6	288.0	6
289.5	6	291.0	6	292.5	6	294.0	6	295.5	6	297.0	6
298.5	5	300.0	5	301.5	5	303.0	5	304.5	5	306.0	5
307.5	5	309.0	5	310.5	5	312.0	5	313.5	5	315.0	5
316.5	5	318.0	5	319.5	5	321.0	5	322.5	5	324.0	5
325.5	5	327.0	5	328.5	5	330.0	5	331.5	5	333.0	5
334.5	5	336.0	5	337.5	5	339.0	5	340.5	5	342.0	4
343.5	4	345.0	4	346.5	4	348.0	4	349.5	4	351.0	4
352.5	4	354.0	4	355.5	4	357.0	4	358.5	4	360.0	4
361.5	4	363.0	4	364.5	4	366.0	4	367.5	4	369.0	4
370.5	4	372.0	3	373.5	3	375.0	3	376.5	3	378.0	3
379.5	3	381.0	3	382.5	3	384.0	3	385.5	3	387.0	3
388.5	3	390.0	3	391.5	3	393.0	3	394.5	3	396.0	3
397.5	3	399.0	3	400.5	3	402.0	3	403.5	3	405.0	3
406.5	3	408.0	3	409.5	3	411.0	3	412.5	3	414.0	3
415.5	3	417.0	3	418.5	3	420.0	3	421.5	3	423.0	3
424.5	3	426.0	3	427.5	2	429.0	2	430.5	3	432.0	3
433.5	2	435.0	2	436.5	2	438.0	2	439.5	2	441.0	2
442.5	2	444.0	2	445.5	2	447.0	2	448.5	2	450.0	2
451.5	2	453.0	2	454.5	2	456.0	2	457.5	2	459.0	2
460.5	2	462.0	2	463.5	2	465.0	2	466.5	2	468.0	2
469.5	2	471.0	2	472.5	2	474.0	2	475.5	2	477.0	2
478.5	2	480.0	2	481.5	2	483.0	2	484.5	2	486.0	2
487.5	2	489.0	2	490.5	2	492.0	2	493.5	2	495.0	2
496.5	2	498.0	2	499.5	2	501.0	2	502.5	2	504.0	2
505.5	2	507.0	2	508.5	2	510.0	2	511.5	2	513.0	2
514.5	2	516.0	2	517.5	2	519.0	2	520.5	2	522.0	2
523.5	2	525.0	2	526.5	2	528.0	2	529.5	2	531.0	2
532.5	2	534.0	2	535.5	2	537.0	2	538.5	2	540.0	2
541.5	2	543.0	2	544.5	2	546.0	1	547.5	1	549.0	1
550.5	1	552.0	1	553.5	1	555.0	2	556.5	2	558.0	1
559.5	1	561.0	1	562.5	1	564.0	1	565.5	1	567.0	1

TABLE 2

568.5	1	570.0	1	571.5	1	573.0	1	574.5	1	576.0	1	
577.5	1	579.0	1	580.5	1	582.0	1	583.5	1	585.0	1	
586.5	1	588.0	1	589.5	1	591.0	1	592.5	1	594.0	1	
595.5	1	597.0	1	598.5	1	600.0	1	601.5	1	603.0	1	
604.5	1	606.0	1	607.5	1	609.0	1	610.5	1	612.0	1	
613.5	1	615.0	1	616.5	1	618.0	1	619.5	1	621.0	1	
622.5	1	624.0	1	625.5	1	627.0	1	628.5	1	630.0	1	
631.5	1	633.0	1	634.5	1	636.0	1	637.5	1	639.0	1	
640.5	1	642.0	1	643.5	1	645.0	1	646.5	1	648.0	1	
649.5	1	651.0	1	652.5	1	654.0	1	655.5	1	657.0	1	
658.5	1	660.0	1	661.5	1	663.0	1	664.5	1	666.0	1	
667.5	1	669.0	1	670.5	1	672.0	1	673.5	1	675.0	1	
676.5	1	678.0	1	679.5	1	681.0	1	682.5	1	684.0	1	
685.5	1	687.0	1	688.5	1	690.0	1	691.5	1	693.0	1	
694.5	1	696.0	1	697.5	1	699.0	1	700.5	1	702.0	1	
703.5	1	705.0	1	706.5	1	708.0	1	709.5	1	711.0	1	
712.5	1	714.0	1	715.5	1	717.0	1	718.5	1	720.0	1	
721.5	1	723.0	1	724.5	1	726.0	1	727.5	1	729.0	1	
730.5	1	732.0	1	733.5	1	735.0	1	736.5	1	738.0	1	
739.5	1	741.0	1	742.5	1	744.0	1	745.5	1	747.0	1	
748.5	1	750.0	1	751.5	1	753.0	1	754.5	1	756.0	1	
757.5	1	759.0	1	760.5	1	762.0	1	763.5	1	765.0	1	
766.5	1	768.0	1	769.5	1	771.0	1	772.5	1	774.0	1	
775.5	1	777.0	1	778.5	1	780.0	1	781.5	1	783.0	1	
784.5	1	786.0	1	787.5	1	789.0	1	790.5	1	792.0	1	
793.5	1	795.0	1	796.5	1	798.0	1	799.5	1	801.0	1	
802.5	1	804.0	1	805.5	1	807.0	1	808.5	1	810.0	1	
811.5	1	813.0	1	814.5	1	816.0	1	817.5	1	819.0	1	
820.5	1	822.0	1	823.5	1	825.0	1	826.5	1	828.0	1	
829.5	1	831.0	1	832.5	1	834.0	1	835.5	1	837.0	1	
838.5	1	840.0	1	841.5	1	843.0	1	844.5	1	846.0	1	
847.5	1	849.0	1	850.5	1	852.0	1	853.5	1	855.0	1	
856.5	1	858.0	1	859.5	1	861.0	1	862.5	1	864.0	1	
865.5	1	867.0	1	868.5	1	870.0	1	871.5	1	873.0	1	
874.5	1	876.0	1	877.5	1	879.0	1	880.5	1	882.0	1	
883.5	1	885.0	1	886.5	1	888.0	1	889.5	1	891.0	1	
892.5	1	894.0	1	895.5	1	897.0	1	898.5	1	900.0	1	
901.5	1	903.0	1	904.5	1	906.0	1	907.5	1	909.0	1	
910.5	1	912.0	1	913.5	1	915.0	1	916.5	1	918.0	1	
919.5	1	921.0	1	922.5	1	924.0	1	925.5	1	927.0	1	
928.5	1	930.0	1	931.5	1	933.0	1	934.5	1	936.0	1	
937.5	1	939.0	1	940.5	1	942.0	1	943.5	1	945.0	1	
946.5	1	948.0	1	949.5	1	951.0	1	952.5	1	954.0	1	
955.5	1	957.0	1	958.5	1	960.0	1	961.5	1	963.0	1	
964.5	1	966.0	1	967.5	1	969.0	1	970.5	1	972.0	1	
973.5	1	975.0	1	976.5	1	978.0	1	979.5	1	981.0	1	
982.5	1	984.0	1	985.5	1	987.0	1	988.5	1	990.0	1	
991.5	1	993.0	1	994.5	1	996.0	1	997.5	1	999.0	1	
1000.5	1	1002.0	1	1003.5	1	1005.0	1	1006.5	1	1008.0	1	
1009.5	1	1011.0	1	1012.5	1	1014.0	1	1015.5	1	1017.0	1	
1018.5	1	1020.0	1	1021.5	1	1023.0	1	1024.5	1	1026.0	1	
1027.5	1	1029.0	1	1030.5	1	1032.0	1	1033.5	1	1035.0	1	
1036.5	1	1038.0	1	1039.5	1	1041.0	1	1042.5	1	1044.0	1	
1045.5	1	1047.0	1	1048.5	1	1050.0	1	1051.5	1	1053.0	1	
1054.5	1	1056.0	1	1057.5	1	1059.0	1	1060.5	1	1062.0	1	
1063.5	1	1065.0	1	1066.5	1	1068.0	1	1069.5	1	1071.0	1	
1072.5	1	1074.0	1	1075.5	1	1077.0	1	1078.5	1	1080.0	1	
1081.5	1	1083.0	1	1084.5	1	1086.0	1	1087.5	1	1089.0	1	
1090.5	1	1092.0	1	1093.5	1	1095.0	1	1096.5	1	1098.0	1	
1099.5	1	1101.0	1	1102.5	1	1104.0	1	1105.5	1	1107.0	0	
1108.5	0	1110.0	0	1111.5	0	1113.0	1	1114.5	1	1116.0	1	
1117.5	1	1119.0	1	1120.5	1	1122.0	1	1123.5	1	1125.0	1	
1126.5	1	1128.0	1	1129.5	1	1131.0	1	1132.5	1	1134.0	1	
1135.5	1	1137.0	1	1138.5	1	1140.0	1	1141.5	1	1143.0	1	

TABLE 2

1144.5	1	1146.0	0	1147.5	0	1149.0	0	1150.5	0	1152.0	0
1153.5	1	1155.0	1	1156.5	1	1158.0	1	1159.5	1	1161.0	1
1162.5	1	1164.0	1	1165.5	1	1167.0	1	1168.5	1	1170.0	1
1171.5	1	1173.0	1	1174.5	1	1176.0	1	1177.5	1	1179.0	1
1180.5	1	1182.0	1	1183.5	1	1185.0	1	1186.5	1	1188.0	0
1189.5	0	1191.0	0	1192.5	0	1194.0	1	1195.5	1	1197.0	1
1198.5	1	1200.0	1	1201.5	1	1203.0	1	1204.5	1	1206.0	0
1207.5	0	1209.0	1	1210.5	1	1212.0	1	1213.5	1	1215.0	1
1216.5	1	1218.0	0	1219.5	0	1221.0	0	1222.5	0	1224.0	0
1225.5	0	1227.0	0	1228.5	1	1230.0	1	1231.5	1	1233.0	1
1234.5	1	1236.0	1	1237.5	1	1239.0	1	1240.5	0	1242.0	0
1243.5	0	1245.0	0	1246.5	0	1248.0	0	1249.5	0	1251.0	1
1252.5	1	1254.0	1	1255.5	0	1257.0	0	1258.5	0	1260.0	0
1261.5	0	1263.0	0	1264.5	0	1266.0	0	1267.5	0	1269.0	0
1270.5	1	1272.0	0	1273.5	0	1275.0	0	1276.5	0	1278.0	1
1279.5	1	1281.0	1	1282.5	1	1284.0	1	1285.5	1	1287.0	0
1288.5	0	1290.0	0	1291.5	0	1293.0	0	1294.5	0	1296.0	0
1297.5	0	1299.0	1	1300.5	1	1302.0	0	1303.5	0	1305.0	0
1306.5	1	1308.0	1	1309.5	1	1311.0	1	1312.5	1	1314.0	1
1315.5	0	1317.0	0	1318.5	0	1320.0	0	1321.5	0	1323.0	0
1324.5	0	1326.0	0	1327.5	0	1329.0	0	1330.5	0	1332.0	0
1333.5	0	1335.0	0	1336.5	0	1338.0	1	1339.5	0	1341.0	1
1342.5	1	1344.0	1	1345.5	1	1347.0	0	1348.5	0	1350.0	0
1351.5	0	1353.0	0	1354.5	0	1356.0	0	1357.5	0	1359.0	0
1360.5	0	1362.0	0	1363.5	0	1365.0	0	1366.5	0	1368.0	0
1369.5	0	1371.0	0	1372.5	0	1374.0	0	1375.5	0	1377.0	0
1378.5	0	1380.0	0	1381.5	0	1383.0	0	1384.5	1	1386.0	1
1387.5	1	1389.0	1	1390.5	1	1392.0	1	1393.5	1	1395.0	1
1396.5	1	1398.0	1	1399.5	1	1401.0	1	1402.5	1	1404.0	1
1405.5	1	1407.0	1	1408.5	1	1410.0	1	1411.5	1	1413.0	1
1414.5	1	1416.0	0	1417.5	0	1419.0	0	1420.5	0	1422.0	0
1423.5	0	1425.0	0	1426.5	1	1428.0	0	1429.5	0	1431.0	0
1432.5	1	1434.0	1	1435.5	1	1437.0	1	1438.5	1	1440.0	1
1441.5	1	1443.0	1	1444.5	1	1446.0	1	1447.5	1	1449.0	1
1450.5	1	1452.0	1	1453.5	0	1455.0	0	1456.5	0	1458.0	0
1459.5	0	1461.0	0	1462.5	0	1464.0	0	1465.5	0	1467.0	0
1468.5	1	1470.0	1	1471.5	1	1473.0	1	1474.5	1	1476.0	1
1477.5	1	1479.0	1	1480.5	1	1482.0	1	1483.5	1	1485.0	1
1486.5	1	1488.0	1	1489.5	1	1491.0	1	1492.5	1	1494.0	1
1495.5	1	1497.0	1	1498.5	1	1500.0	1	1501.5	1	1503.0	1
1504.5	1	1506.0	1	1507.5	1	1509.0	1	1510.5	1	1512.0	1
1513.5	1	1515.0	1	1516.5	1	1518.0	1	1519.5	1	1521.0	1
1522.5	1	1524.0	1	1525.5	1	1527.0	1	1528.5	1	1530.0	0
1531.5	0	1533.0	0	1534.5	0	1536.0	0	1537.5	0	1539.0	0
1540.5	0	1542.0	0	1543.5	0	1545.0	0	1546.5	0	1548.0	0
1549.5	0	1551.0	0	1552.5	0	1554.0	0	1555.5	0	1557.0	0
1558.5	0	1560.0	0	1561.5	0	1563.0	0	1564.5	0	1566.0	0
1567.5	0	1569.0	0	1570.5	0	1572.0	0	1573.5	0	1575.0	0
1576.5	0	1578.0	0	1579.5	0	1581.0	0	1582.5	0	1584.0	0
1585.5	0	1587.0	0	1588.5	0	1590.0	0	1591.5	0	1593.0	1
1594.5	1	1596.0	1	1597.5	1	1599.0	1	1600.5	1	1602.0	0
1603.5	0	1605.0	0	1606.5	1	1608.0	1	1609.5	1	1611.0	1
1612.5	1	1614.0	1	1615.5	1	1617.0	1	1618.5	1	1620.0	1
1621.5	0	1623.0	0	1624.5	0	1626.0	0	1627.5	0	1629.0	0
1630.5	0	1632.0	0	1633.5	0	1635.0	0	1636.5	0	1638.0	0
1639.5	0	1641.0	0	1642.5	0	1644.0	1	1645.5	1	1647.0	0
1648.5	0	1650.0	0	1651.5	0	1653.0	0	1654.5	0	1656.0	0
1657.5	0	1659.0	0	1660.5	0	1662.0	0	1663.5	0	1665.0	0
1666.5	0	1668.0	1	1669.5	2	1671.0	6	1672.5	21	1674.0	37
1675.5	53	1677.0	70	1678.5	94	1680.0	110	1681.5	125	1683.0	133
1684.5	141	1686.0	147	1687.5	146	1689.0	141	1690.5	133	1692.0	110
1693.5	109	1695.0	86	1696.5	70	1698.0	61	1699.5	53	1701.0	45
1702.5	38	1704.0	34	1705.5	34	1707.0	38	1708.5	45	1710.0	53
1711.5	61	1713.0	69	1714.5	77	1716.0	85	1717.5	86	1719.0	97

TABLE 2

1720.5	102	1722.0	105	1723.5	108	1725.0	109	1726.5	110	1728.0	108
1729.5	104	1731.0	102	1732.5	98	1734.0	90	1735.5	86	1737.0	82
1738.5	77	1740.0	70	1741.5	66	1743.0	61	1744.5	58	1746.0	54
1747.5	50	1749.0	46	1750.5	42	1752.0	38	1753.5	38	1755.0	37
1756.5	34	1758.0	33	1759.5	30	1761.0	29	1762.5	26	1764.0	26
1765.5	25	1767.0	22	1768.5	21	1770.0	18	1771.5	17	1773.0	14
1774.5	13	1776.0	13	1777.5	10	1779.0	9	1780.5	9	1782.0	8
1783.5	7	1785.0	7	1786.5	6	1788.0	5	1789.5	5	1791.0	5
1792.5	5	1794.0	4	1795.5	4	1797.0	4	1798.5	3	1800.0	3
1801.5	3	1803.0	3	1804.5	3	1806.0	2	1807.5	2	1809.0	2
1810.5	2	1812.0	2	1813.5	2	1815.0	2	1816.5	2	1818.0	2
1819.5	2	1821.0	3	1822.5	3	1824.0	4	1825.5	4	1827.0	5
1828.5	6	1830.0	6	1831.5	7	1833.0	8	1834.5	9	1836.0	9
1837.5	10	1839.0	10	1840.5	10	1842.0	11	1843.5	12	1845.0	13
1846.5	13	1848.0	14	1849.5	14	1851.0	14	1852.5	14	1854.0	15
1855.5	15	1857.0	15	1858.5	15	1860.0	15	1861.5	15	1863.0	14
1864.5	14	1866.0	13	1867.5	13	1869.0	12	1870.5	10	1872.0	9
1873.5	9	1875.0	7	1876.5	7	1878.0	5	1879.5	5	1881.0	4
1882.5	4	1884.0	3	1885.5	3	1887.0	3	1888.5	2	1890.0	2
1891.5	2	1893.0	2	1894.5	2	1896.0	1	1897.5	1	1899.0	1
1900.5	1	1902.0	1	1903.5	1	1905.0	1	1906.5	1	1908.0	1
1909.5	2	1911.0	2	1912.5	2	1914.0	2	1915.5	2	1917.0	2
1918.5	2	1920.0	2	1921.5	2	1923.0	3	1924.5	3	1926.0	3
1927.5	3	1929.0	3	1930.5	3	1932.0	3	1933.5	3	1935.0	3
1936.5	3	1938.0	3	1939.5	3	1941.0	3	1942.5	2	1944.0	2
1945.5	2	1947.0	2	1948.5	2	1950.0	2	1951.5	1	1953.0	1
1954.5	1	1956.0	1	1957.5	1	1959.0	1	1960.5	1	1962.0	1
1963.5	1	1965.0	1	1966.5	1	1968.0	1	1969.5	1	1971.0	1
1972.5	1	1974.0	1	1975.5	1	1977.0	1	1978.5	1	1980.0	1
1981.5	1	1983.0	1	1984.5	1	1986.0	1	1987.5	1	1989.0	1
1990.5	1	1992.0	1	1993.5	1	1995.0	1	1996.5	1	1998.0	1
1999.5	1	2001.0	1	2002.5	1	2004.0	1	2005.5	1	2007.0	1
2008.5	1	2010.0	1	2011.5	1	2013.0	1	2014.5	1	2016.0	1
2017.5	1	2019.0	1	2020.5	1	2022.0	1	2023.5	1	2025.0	1
2026.5	1	2028.0	1	2029.5	1	2031.0	1	2032.5	1	2034.0	1
2035.5	1	2037.0	1	2038.5	1	2040.0	1	2041.5	1	2043.0	1
2044.5	1	2046.0	1	2047.5	1	2049.0	1	2050.5	1	2052.0	1
2053.5	1	2055.0	1	2056.5	1	2058.0	1	2059.5	1	2061.0	1
2062.5	1	2064.0	1	2065.5	1	2067.0	1	2068.5	1	2070.0	1
2071.5	1	2073.0	1	2074.5	1	2076.0	1	2077.5	1	2079.0	1
2080.5	1	2082.0	1	2083.5	1	2085.0	1	2086.5	1	2088.0	1
2089.5	1	2091.0	1	2092.5	1	2094.0	1	2095.5	1	2097.0	1
2098.5	1	2100.0	1	2101.5	1	2103.0	1	2104.5	1	2106.0	1
2107.5	1	2109.0	1	2110.5	1	2112.0	1	2113.5	1	2115.0	1
2116.5	1	2118.0	1	2119.5	1	2121.0	1	2122.5	1	2124.0	1
2125.5	1	2127.0	1	2128.5	1	2130.0	1	2131.5	1	2133.0	1
2134.5	1	2136.0	1	2137.5	1	2139.0	1	2140.5	1	2142.0	1
2143.5	1	2145.0	1	2146.5	1	2148.0	1	2149.5	1	2151.0	1
2152.5	1	2154.0	1	2155.5	1	2157.0	1	2158.5	1	2160.0	1
2161.5	1	2163.0	1	2164.5	1	2166.0	1	2167.5	1	2169.0	1
2170.5	1	2172.0	1	2173.5	1	2175.0	1	2176.5	1	2178.0	1
2179.5	1	2181.0	1	2182.5	1	2184.0	1	2185.5	1	2187.0	1
2188.5	1	2190.0	1	2191.5	1	2193.0	1	2194.5	1	2196.0	0
2197.5	0	2199.0	0	2200.5	0	2202.0	0	2203.5	0	2205.0	0
2206.5	0	2208.0	0	2209.5	0	2211.0	0	2212.5	0	2214.0	0
2215.5	0	2217.0	1	2218.5	1	2220.0	1	2221.5	1	2223.0	1
2224.5	1	2226.0	1	2227.5	1	2229.0	1	2230.5	1	2232.0	0
2233.5	0	2235.0	0	2236.5	0	2238.0	0	2239.5	0	2241.0	0
2242.5	0	2244.0	0	2245.5	0	2247.0	0	2248.5	0	2250.0	0
2251.5	0	2253.0	0	2254.5	0	2256.0	0	2257.5	0	2259.0	0
2260.5	0	2262.0	1	2263.5	1	2265.0	1	2266.5	1	2268.0	0
2269.5	0	2271.0	0	2272.5	0	2274.0	0	2275.5	0	2277.0	0
2278.5	0	2280.0	0	2281.5	0	2283.0	0	2284.5	0	2286.0	0
2287.5	0	2289.0	0	2290.5	0	2292.0	0	2293.5	0	2295.0	0

TABLE C

2296.5	0	2298.0	0	2299.5	0	2301.0	0	2302.5	0	2304.0	0
2305.5	0	2307.0	0	2308.5	0	2310.0	0	2311.5	0	2313.0	0
2314.5	0	2316.0	1	2317.5	0	2319.0	0	2320.5	0	2322.0	0
2323.5	0	2325.0	0	2326.5	0	2328.0	0	2329.5	0	2331.0	0
2332.5	0	2334.0	0	2335.5	0	2337.0	0	2338.5	0	2340.0	1
2341.5	0	2343.0	0	2344.5	0	2346.0	0	2347.5	0	2349.0	0
2350.5	0	2352.0	0	2353.5	0	2355.0	0	2356.5	0	2358.0	0
2359.5	0	2361.0	0	2362.5	0	2364.0	0	2365.5	0	2367.0	0
2368.5	0	2370.0	0	2371.5	0	2373.0	0	2374.5	0	2376.0	0
2377.5	0	2379.0	0	2380.5	0	2382.0	0	2383.5	0	2385.0	0
2386.5	0	2388.0	0	2389.5	0	2391.0	0	2392.5	0	2394.0	0
2395.5	0	2397.0	0	2398.5	0	2400.0	0	2401.5	0	2403.0	0
2404.5	0	2406.0	0	2407.5	0	2409.0	0	2410.5	0	2412.0	0
2413.5	0	2415.0	0	2416.5	0	2418.0	0	2419.5	0	2421.0	0
2422.5	0	2424.0	0	2425.5	0	2427.0	0	2428.5	0	2430.0	0
2431.5	0	2433.0	0	2434.5	0	2436.0	0	2437.5	0	2439.0	0
2440.5	0	2442.0	0	2443.5	0	2445.0	0	2446.5	0	2448.0	0
2449.5	0	2451.0	0	2452.5	0	2454.0	0	2455.5	0	2457.0	0
2458.5	0	2460.0	0	2461.5	0	2463.0	0	2464.5	0	2466.0	0
2467.5	0	2469.0	0	2470.5	0	2472.0	0	2473.5	0	2475.0	0
2476.5	0	2478.0	0	2479.5	0	2481.0	0	2482.5	0	2484.0	0
2485.5	0	2487.0	0	2488.5	0	2490.0	0	2491.5	0	2493.0	0
2494.5	0	2496.0	0	2497.5	0	2499.0	0	2500.5	0	2502.0	0
2503.5	0	2505.0	0	2506.5	0	2508.0	0	2509.5	0	2511.0	0
2512.5	0	2514.0	0	2515.5	0	2517.0	0	2518.5	0	2520.0	0
2521.5	0	2523.0	0	2524.5	0	2526.0	0	2527.5	0	2529.0	0
2530.5	0	2532.0	0	2533.5	0	2535.0	0	2536.5	0	2538.0	0
2539.5	0	2541.0	0	2542.5	0	2544.0	0	2545.5	0	2547.0	0
2548.5	0	2550.0	0	2551.5	0	2553.0	0	2554.5	0	2556.0	0
2557.5	0	2559.0	0	2560.5	0	2562.0	0	2563.5	0	2565.0	0
2566.5	0	2568.0	0	2569.5	0	2571.0	0	2572.5	0	2574.0	0
2575.5	0	2577.0	0	2578.5	0	2580.0	0	2581.5	0	2583.0	0
2584.5	0	2586.0	0	2587.5	0	2589.0	0	2590.5	0	2592.0	0
2593.5	0	2595.0	0	2596.5	0	2598.0	0	2599.5	0	2601.0	0
2602.5	0	2604.0	0	2605.5	0	2607.0	0	2608.5	0	2610.0	0
2611.5	0	2613.0	0	2614.5	0	2616.0	0	2617.5	0	2619.0	0
2620.5	0	2622.0	0	2623.5	0	2625.0	0	2626.5	0	2628.0	0
2629.5	0	2631.0	0	2632.5	0	2634.0	0	2635.5	0	2637.0	0
2638.5	0	2640.0	0	2641.5	0	2643.0	0	2644.5	0	2646.0	0
2647.5	0	2649.0	0	2650.5	0	2652.0	0	2653.5	0	2655.0	0
2656.5	0	2658.0	0	2659.5	0	2661.0	0	2662.5	0	2664.0	0
2665.5	0	2667.0	0	2668.5	0	2670.0	0	2671.5	0	2673.0	0
2674.5	0	2676.0	0	2677.5	0	2679.0	0	2680.5	0	2682.0	0
2683.5	0	2685.0	0	2686.5	0	2688.0	0	2689.5	0	2691.0	0
2692.5	0	2694.0	0	2695.5	0	2697.0	0	2698.5	0	2700.0	0
2701.5	0	2703.0	0	2704.5	0	2706.0	0	2707.5	0	2709.0	0
2710.5	0	2712.0	0	2713.5	0	2715.0	0	2716.5	0	2718.0	0
2719.5	0	2721.0	0	2722.5	0	2724.0	0	2725.5	0	2727.0	0
2728.5	0	2730.0	0	2731.5	0	2733.0	0	2734.5	0	2736.0	0
2737.5	0	2739.0	0	2740.5	0	2742.0	0	2743.5	0	2745.0	0
2746.5	0	2748.0	0	2749.5	0	2751.0	0	2752.5	0	2754.0	0
2755.5	0	2757.0	0	2758.5	0	2760.0	0	2761.5	0	2763.0	0
2764.5	0	2766.0	0	2767.5	0	2769.0	0	2770.5	0	2772.0	0
2773.5	0	2775.0	0	2776.5	0	2778.0	0	2779.5	0	2781.0	0
2782.5	0	2784.0	0	2785.5	0	2787.0	0	2788.5	0	2790.0	0
2791.5	0	2793.0	0	2794.5	0	2796.0	0	2797.5	0	2799.0	0
2800.5	0	2802.0	0	2803.5	0	2805.0	0	2806.5	0	2808.0	0
2809.5	0	2811.0	0	2812.5	0	2814.0	0	2815.5	0	2817.0	0
2818.5	0	2820.0	0	2821.5	0	2823.0	0	2824.5	0	2826.0	0
2827.5	0	2829.0	0	2830.5	0	2832.0	0	2833.5	0	2835.0	0
2836.5	0	2838.0	0	2839.5	0	2841.0	0	2842.5	0	2844.0	0
2845.5	0	2847.0	0	2848.5	0	2850.0	0	2851.5	0	2853.0	0
2854.5	0	2856.0	0	2857.5	0	2859.0	0	2860.5	0	2862.0	0
2863.5	0	2865.0	0	2866.5	0	2868.0	0	2869.5	0	2871.0	0

TABLE 2

2872.5	0	2874.0	0	2875.5	0	2877.0	0	2878.5	0	2880.0	0
2881.5	0	2883.0	0	2884.5	0	2886.0	0	2887.5	0	2889.0	0
2890.5	0	2892.0	0	2893.5	0	2895.0	0	2896.5	0	2898.0	0
2899.5	0	2901.0	0	2902.5	0	2904.0	0	2905.5	0	2907.0	0
2908.5	0	2910.0	0	2911.5	0	2913.0	0	2914.5	0	2916.0	0
2917.5	0	2919.0	0	2920.5	0	2922.0	0	2923.5	0	2925.0	0
2926.5	0	2928.0	0	2929.5	0	2931.0	0	2932.5	0	2934.0	0
2935.5	0	2937.0	0	2938.5	0	2940.0	0	2941.5	0	2943.0	0
2944.5	0	2946.0	0	2947.5	0	2949.0	0	2950.5	0	2952.0	0
2953.5	0	2955.0	0	2956.5	0	2958.0	0	2959.5	0	2961.0	0

TABLE 3

TABLE 3

1766.0	0.1629E-02	0.1344E 01
2650.0	0.1570E-02	0.1009E 01
1.5	0.3919E-09	0.5879E-09
3.0	0.2280E-08	0.4008E-08
4.5	0.4810E-08	0.1122E-07
6.0	0.6176E-08	0.2049E-07
7.5	0.1202E-07	0.3852E-07
9.0	0.1539E-07	0.6161E-07
10.5	0.2328E-07	0.9653E-07
12.0	0.4294E-07	0.1609E-06
13.5	0.5243E-07	0.2396E-06
15.0	0.6591E-07	0.3385E-06
16.5	0.8622E-07	0.4678E-06
18.0	0.1035E-06	0.6239E-06
19.5	0.1254E-06	0.8111E-06
21.0	0.1769E-06	0.1077E-05
22.5	0.1937E-06	0.1367E-05
24.0	0.2250E-06	0.1705E-05
25.5	0.2626E-06	0.2098E-05
27.0	0.3232E-06	0.2583E-05
28.5	0.3966E-06	0.3178E-05
30.0	0.4941E-06	0.3919E-05
31.5	0.5578E-06	0.4756E-05
33.0	0.6467E-06	0.5726E-05
34.5	0.7068E-06	0.6786E-05
36.0	0.7730E-06	0.7946E-05
37.5	0.8907E-06	0.9282E-05
39.0	0.9795E-06	0.1075E-04
40.5	0.1678E-05	0.123/E-04
42.0	0.1238E-05	0.1423E-04
43.5	0.1323E-05	0.1621E-04
45.0	0.1432E-05	0.1836E-04
46.5	0.1552E-05	0.2069E-04
48.0	0.1678E-05	0.2329E-04
49.5	0.1843E-05	0.2597E-04
51.0	0.1991E-05	0.2896E-04
52.5	0.2139E-05	0.3216E-04
54.0	0.2332E-05	0.3566E-04
55.5	0.2593E-05	0.3955E-04
57.0	0.2881E-05	0.4387E-04
58.5	0.3189E-05	0.4866E-04
60.0	0.3715E-05	0.5423E-04
61.5	0.4243E-05	0.6059E-04
63.0	0.4871E-05	0.6799E-04
64.5	0.6051E-05	0.7698E-04
66.0	0.7071E-05	0.8758E-04
67.5	0.7986E-05	0.9956E-04
69.0	0.9049E-05	0.1131E-03
70.5	0.9748E-05	0.1278E-03
72.0	0.1028E-04	0.1432E-03
73.5	0.1071E-04	0.1592E-03
75.0	0.1115E-04	0.1760E-03
76.5	0.1160E-04	0.1934E-03
78.0	0.1206E-04	0.2115E-03
79.5	0.1253E-04	0.2303E-03
81.0	0.1301E-04	0.2498E-03
82.5	0.1350E-04	0.2700E-03
84.0	0.1399E-04	0.2910E-03
85.5	0.1450E-04	0.3128E-03
87.0	0.1501E-04	0.3353E-03
88.5	0.1553E-04	0.3586E-03
90.0	0.1607E-04	0.3827E-03
91.5	0.1661E-04	0.4076E-03

END

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